

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the subject application. The non-Final Office Action of September 4, 2002 has been received and contents carefully reviewed.

Claims 12-16 have been added. Claims 1-16 are currently pending. Claims 1-6 have been withdrawn from consideration.

The Examiner rejected claims 7-11 under 35 USC § 103(a) as being unpatentable over Cathey, Jr. (US Patent No. 5,100,505) in view of Murphy et al. (US Patent No. 6,387,822). Applicants respectfully traverse this rejection.

Claim 7 is allowable at least for the reason that claim 7 recites a combination of elements including a method of etching molybdenum on a substrate, comprising preparing a solution comprising 5 to 20 % by weight of hydrogen peroxide (H₂O₂), 75 to 94% by weight of water, and an additive, including a pH controlling agent; and applying the solution to the substrate. None of the cited references, singly or in combination, teaches or suggests at least these features of the claimed invention.

The Examiner alleges that Cathey, Jr. discloses a method of etching molybdenum including all the features of the claims except for the hydrogen peroxide. The Examiner cites Murphy et al. in an attempt to cure the deficiencies of Cathey, Jr.

Neither Cathey, Jr. nor Murphy et al. disclose the concentration of the compositions that comprise the solution. Cathey, Jr. is directed to depositing a silicon compound on the metal sidewall of the metal layer during the etching process. Column 3, lines 48-59 of Cathey, Jr. reads: "The etchant material comprises a chemical etchant composition and a coating composition comprising water vapor or a gaseous oxide of nitrogen, particularly N₂O, and a silicon-containing compound, respectively. Murphy et al. teaches a process using ozonated deionized water spray for resist strip and resist residue removal. Column 4, lines 11-19 read: "A drawback of the above approach is that higher levels of metal contamination can occur versus a prior art H₂SO₄ and H₂O₂ clean. Accordingly, the above process may be followed by a SC2 (H₂O:HCl:H₂O₂) to remove metal contamination." Murphy et al. fails to cure the deficiencies of Cathey, Jr.

Cathey, Jr. does not teach or suggest the claimed invention as a whole. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*,

713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983); see also *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976). The invention of this application comprises a method of etching molybdenum on a substrate. Cathey, Jr. may teach etching a semiconductor device to form a predetermined etched pattern using specific processes and specific apparatuses, but fail to teach or suggest explicitly or implicitly a method of etching molybdenum on a substrate using the concentration of a solution recited by claim 7.

Further, the Applicant has discovered through experimentation that a molybdenum layer etched by the inventive etchant solution exhibits excellent properties in taper profile, etching uniformity, etching rate, as well as under-cut using the claimed method. Applicant has discovered the source of a problem and through experimentation, has identified a solution. Cathey, Jr. is not attempting to solve similar problems with the same solution. "[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole', which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Spinnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem . . . does not always result in a patentable invention. . . . [A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem." *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original).

Furthermore, the Examiner has not pointed out a particular finding as to the specific understanding or principle within the knowledge of a skilled artisan, either expressly or by implication that would have motivated one with no knowledge to combine or modify Cathey, Jr. with Murphy et al. Applicant respectfully submits that no proper motivation or suggestion is found for one of ordinary skill in the art to modify Cathey, Jr. to arrive at the claimed method. Further, such combination is suggested only by the claimed invention, which is considered impermissible hindsight reconstruction. Through the combination of references used by the Examiner, he has taken a specific aspect of the claim, i.e., hydrogen peroxide, to be the only advantage of the invention, and disregarded the other elements of the claim. Accordingly, Applicant respectfully requests withdrawal of the rejection based on the combination of references. Applicant respectfully submits that the Examiner has failed to establish a *prima facie*

case of obviousness. Applicant respectfully requests that the rejection under 35 USC § 103(a) be withdrawn.

Accordingly, Applicants respectfully submit that independent claim 7, and claims 8-16 which depend therefrom, are allowable over the cited references.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

If the Examiner deems that a telephone conference would help expedite the prosecution of this application, the Examiner is requested to call the undersigned attorney at (202) 496-7371. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50 -0911. Please credit any overpayment to deposit Account No. 50-0911.

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Respectfully submitted,

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